



Research Use Only

Extracellular Vesicles derived from Cheese Whey

Cat. No. EXCW1000

June 25, 2026

[1] Background

Exosomes are membrane vesicles with a diameter of approximately 50–150 nm that are secreted by most cells. They encapsulate miRNA, mRNA, proteins, peptides, and other molecules, and are suggested to play a role in transmitting information from the originating cell or tissue to distant target cells or tissues. Microorganisms also secrete extracellular vesicles (EVs) similar to exosomes.

This product is a purified fraction derived from cheese whey, which is generated during the cheese-making process using raw milk. It contains both bovine-derived milk exosomes (2,254.8 µg/mL, measured using the Cosmo Bio EXBMEL Bovine Milk Exosome ELISA Kit) and lactic acid bacteria-derived EVs secreted during fermentation (1.378×10^7 particles/mL, measured using the Cosmo Bio EVEL01 Gram-positive bacteria EV Quantification ELISA Kit). This product is purified from cheese whey with three step purification process, ultrafiltration, and ion-exchange chromatography 1 and 2. Through removal of impurities such as lipids and protein components, a highly purified EV fraction is obtained. The product is prepared at high particle density (5×10^{12} particles/mL) and can be used for a wide range of applications from in vitro to in vivo studies as a DDS carrier. Bulk supply is also available upon request.

Milk Exosome + LAB EVs

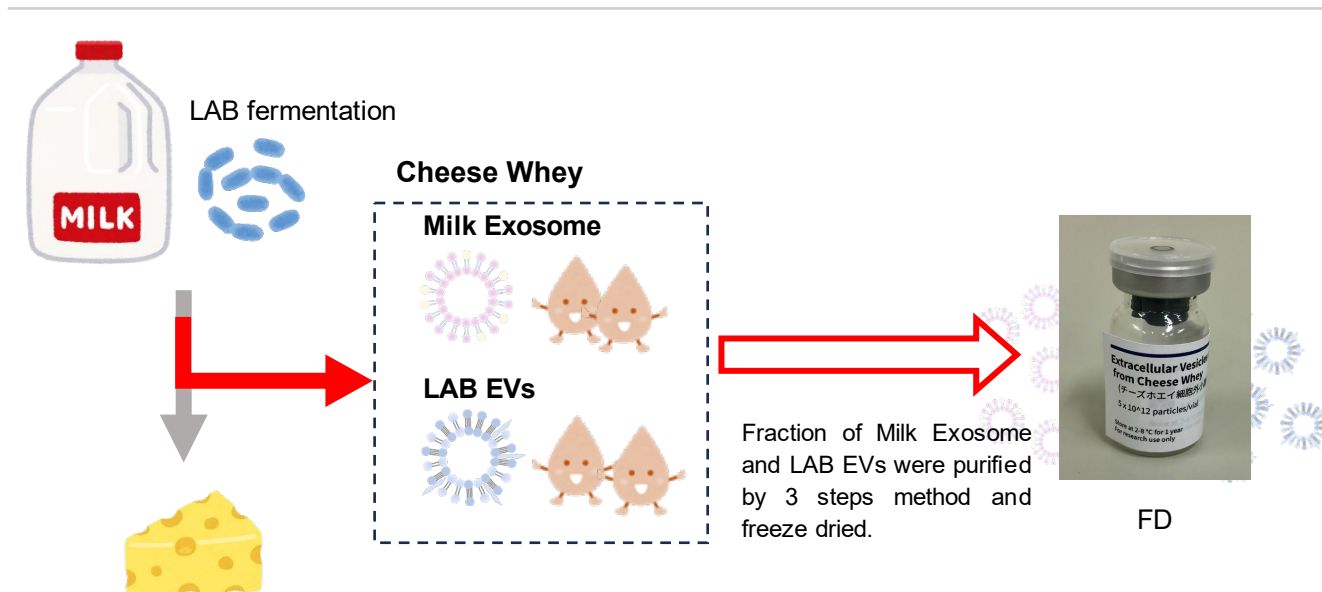


Fig. 1. Overview of Cheese Whey-Derived EVs Production Diagram

[II] Instructions for Use

1. Return it to room temperature before use.
2. Add 1 mL of sterile distilled water and mix gently until dissolved. After reconstitution, store at 4°C and use within 3 months.
3. Dilute the reconstituted solution 1:1000 to 1:10,000 in culture medium before use.

[III] Reference materials

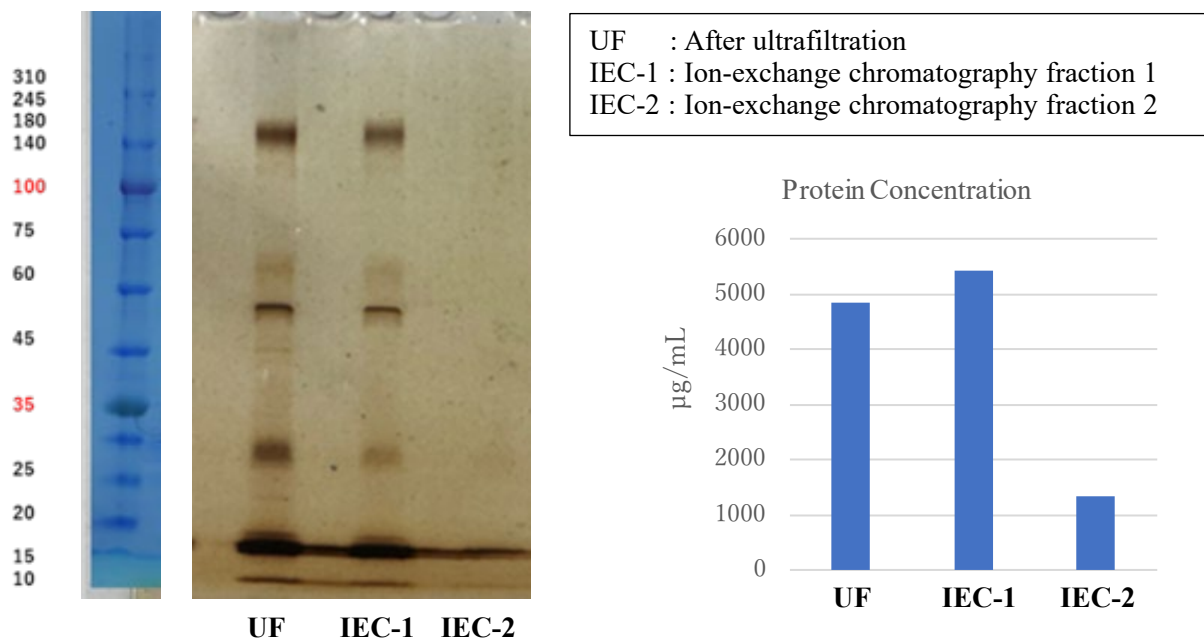


Fig. 2. SDS-PAGE analysis and protein quantification

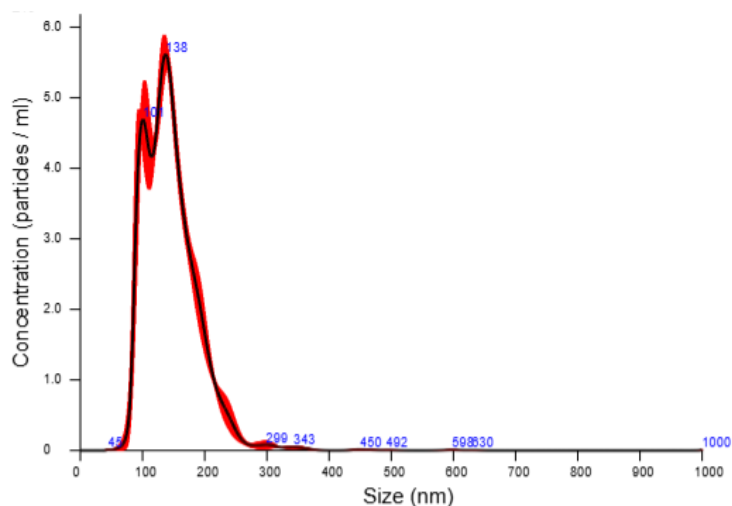


Fig. 3. Particle size distribution (Nano Sight)

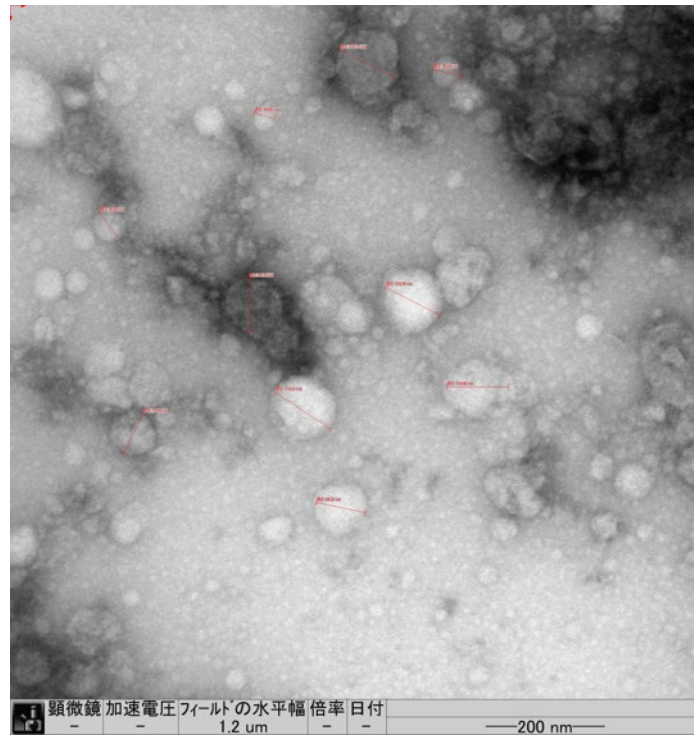


Fig.4 Electron microscope observation (TEM) Two different sizes of nanoparticles were observed

Item No.	Product Name	Package	Particle Count	Example Applications	Storage
EXCW1000	Extracellular Vesicles from Cheese Whey	Freeze-dried (1 mL)	5×10^{12} particles/mL	Promotion of epidermal cell proliferation; enhancement of collagen synthesis in fibroblasts, etc.	Refrigerated

[III] Reference Data

1, Anti-inflammatory effect (Inhibition of M1 macrophage polarization)

- Rat macrophage Raw264.7 cells were seeded at a density (3×10^5 cells/well) in a 24-well plate. EVs samples were added to the cells at 7.77×10^7 Particles /well for 2hr. After addition of LPS(10ng/ml) , cells were incubated at 37C for 16hr.
- We analyzed IL-6 gene expression using real-time PCR
- Cheese whey EVs suppress the inflammation..

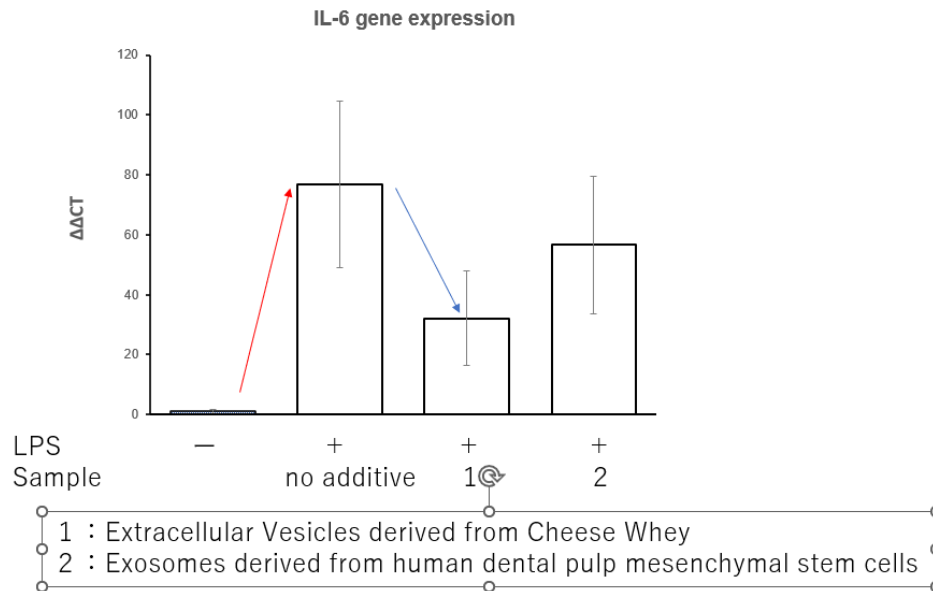


Fig.5 Inhibition of M1 macrophage polarization

2, Epidermal Cell Proliferation

Human epidermal HaCaT cells were seeded at low density (3×10^3 cells/well) in a 96-well plate. EVs samples were added at a 1:1000 dilution. After 48 hours, cells were fixed with 4% paraformaldehyde and stained with Giemsa. Colony area was quantified using ImageJ.

Compared with the control (no addition), the colony area increased in the group treated with cheese whey-derived EVs. Furthermore, the activity approached that of the positive control group treated with exosomes derived from human dental pulp mesenchymal stem cells. Example shown: 1:1000 dilution.

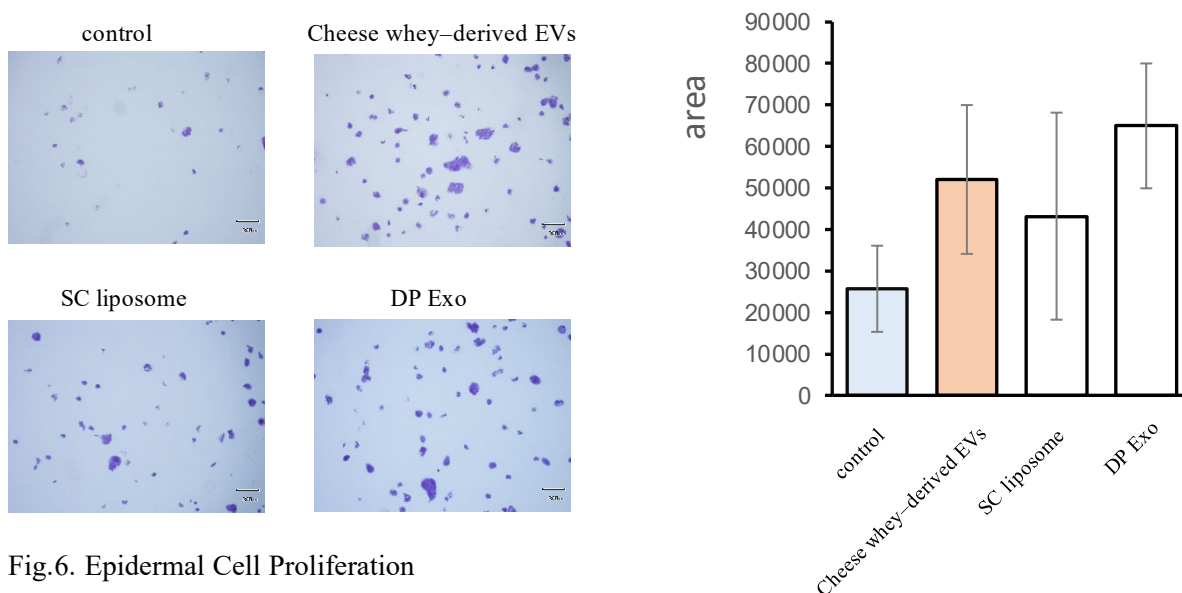


Fig.6. Epidermal Cell Proliferation

Extracellular Vesicles derived from Cheese Whey promote Collagen synthesis

- Human dermal fibroblasts were seeded at a density (1×10^5 cells/well) in a 24-well plate. EVs samples were added at 10 to 1000 times dilution, and cultured for 6day at 37C .
- We measured the collagen levels in the culture supernatant with ELISA.
- Extracellular vesicles (EVs) promote collagen synthesis in fibroblasts in a dose-dependent manner.

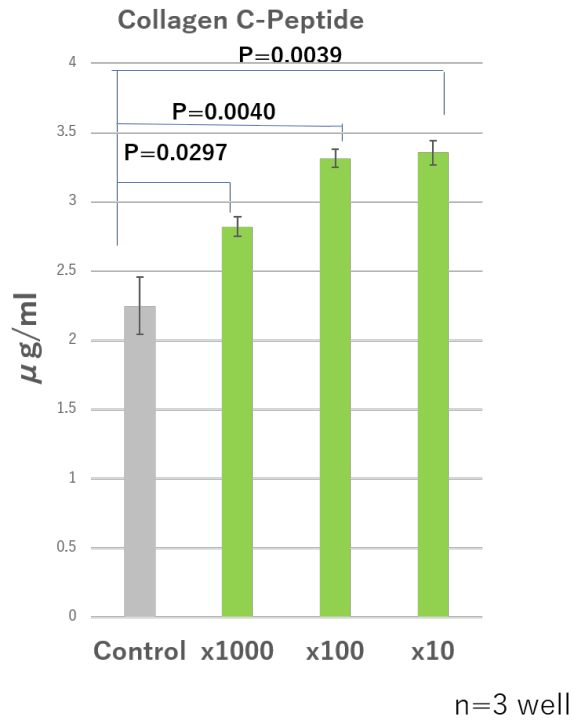


Fig.7 Collagen synthesis

[IV] References

- [1] Maghraby MK, *et al.*, Extracellular vesicles isolated from milk can improve gut barrier dysfunction induced by malnutrition, *Scientific Reports.*, 2021, **11**:7635.
- [2] Cui Z, *et al.*, Potential therapeutic effects of milk-derived exosomes on intestinal diseases, *J. Nanobiotechnology.*, 2023, **21**:496.
- [3] Lu L, *et al.*, Novel roles of bovine milk-derived exosomes in skin antiaging, *J. Cosmet. Dermatol.* 2024, **23**:1374–1385.

[V] Not for Human Use.